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LOSING MONEY WITH OPTIONS

Advanced Techniques



Simon Gleadall

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Advanced Options Trading Guides

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Volcube Advanced Options Trading Guides

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About Volcube

Volcube provides a leading options education technology to firms and individuals who want to learn about professional options and volatility trading. The Volcube technology is a web-based option market simulator with embedded, automated teaching tools and a rich learning library. Volcube was founded in 2010.

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About the author

Simon Gleadall is one of the co-founders of Volcube and has traded options and other derivatives since 1999. He works closely with the Volcube development team on upgrades to the simulation technology and also co-produces much of the original learning content. He can be reached via simon@volcube.com.

About the Volcube Advanced Options Trading Guides series

Clear and concise guides that explore more advanced options trading topics. Check out all the volumes in the series...

volume I : *Option Gamma Trading*

volume II : *Option Volatility Trading : Strategies and Risk*

volume III : *Option Market Making : Part I : An Introduction*

volume IV: *Trading Implied Volatility : An Introduction*

volume V: *Option Greeks for Traders :*

Part I : Delta, Vega & Theta
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Introduction

Options are powerful contracts with inherently explosive profit and loss potential. There are simple ways to lose money with options; none simpler than buying and watching them decay to nothing or selling short and watching them fly in-the-money. But there are also far more cunning and more spectacular ways to lose fortunes, small or large, with options. This volume focuses on advanced techniques for losing money with options. The strategies and tactics described are, in many cases, guaranteed to generate losses. The author himself

has put many of these methods into practice, sometimes on multiple occasions, and can vouch for their efficacy in causing profits to be steadily eroded or even instantaneously obliterated.

The examples detailed in what follows can broadly be categorised into :

- physical errors such as accidental entry order

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Naturally, we are human and mistakes will happen. What matters is that the frequency of such errors is as low as possible and that systems to counter their ill-effects are in place. Most physical errors and technical blunders are avoidable by increasing alertness and by being aware of the likely points of failure. Working hard to improve concentration pays dividends. Analyse errors when they occur to ensure they are very likely to go unrepeatd. Errors

that relate to ignorance can also be reduced via hard work and study. Market movements may be largely unpredictable but the likely effects on options contracts over a span of possible outcomes can be broadly predicted in advance. Partly this comes via experience, but also by understanding 'how options work'. Ignorance regarding market events and conditions is quickly rectified with effort. Plenty of resources exist to ensure a trader is up-to-speed; the point is to take notice of that which matters, and to filter out that which does not.

If preservation of capital is one of the keys to long term growth, then reducing the error count is vital. Ideally, losses

would only ever be due to a strategy mis-firing and the likelihood of this, one hopes, is 'priced-in' by the trader in advance. This then is what a trader must strive for; to only lose money when the market is unfavourable to his plan. And not because he has fumbled an order entry or traded into a strategy on false pretences due to technical ignorance. This book hopes to outline some of the likely trouble spots for the options trader. No such sketch could ever be comprehensive, but avoiding even just one of these common *faux pas*, could save a trader's day, week, year or even career.

Directional trading

By directional trading is meant the use of options to trade or hedge the directional price changes of the underlying. This is as opposed to using the options as volatility trading instruments. These two types of trading should not be seen as either/or. Indeed, probably the greatest mistake directional option traders can make is to ignore the volatility side of an option's nature. It is perfectly feasible to trade options understanding little more than their definition and basic payoff

profile at expiration. However, when directional traders look to add more sophistication to their strategies (particularly as relates to timing and trading in and out without waiting until expiry), then a lack of understanding as to 'how options function' is probably their greatest risk.

Ignoring implied volatility

An apocryphal story told to many junior option traders recounts how an unnamed trading firm in the 1970s correctly predicted one of the oil price spikes. In anticipation of the move, they sold some puts short, intending to buy them back more cheaply for a profit when the oil price rose. Puts of course have a

negative delta so when the underlying price rises, they will lose value, other things being equal. However, other things are not always equal. And when the trading firm checked on the current value of the puts after the oil price rally (which they correctly predicted), they were dismayed to find that the puts were worth more than they were when the traders sold them, when the underlying had been trading much lower. The traders had entirely overlooked the effect implied volatility has on option pricing. In this case, the massive up-shock in prices caused uncertainty and expectations of higher future volatility; the net result of which is almost always an increase in implied volatility. In

extreme cases, the change in option value due to a change in implied volatility can exceed the change in option value due to a change in the underlying, *even for substantial moves in the underlying*. So if an option trading strategy is based on the directional movement of the underlying and the trade is not simply one that will be held until expiration, it is important for the trader to consider the other components that can affect option value. This is probably the number one failing of directional option traders. Predicating an option's value *prior to expiration*, contingent on the spot price alone leaves the trader exposed to other factors. The solution is to ensure the trader has

sufficient knowledge and understanding about *all* the factors that influence option value. Directional option strategies that may be closed out before expiration should be analysed with different variables moving in different directions.

Ignoring time decay

Some directional option traders are familiar with option delta and can use it to estimate the change in option value for a change in the spot price. So they might estimate that if they are correct in their prediction and the spot market rallies \$1, then their long 25% delta calls will be worth at least 25 cents more. The problem with this line of thinking is that it is very approximate and omits several

potentially important mitigating factors. Implied volatility may be one, as we saw above. Another crucial element is the passage of time. Time passing is not something that traders of the underlying have much cause to consider. Buying the underlying (a stock, a futures contract, a bond etc.) does not involve incurring losses day-to-day, simply because time has passed. Underlyings tend to have long horizons; they are not generally programmed to expire in the coming weeks, if at all. Options on the other hand, being time-limited contracts, can feel the effects of the clock's movement. Put simply, the value of out-of-the-money options, fades as time passes. So the trader reasoning with respect to 25%

delta calls really ought to consider the value they will lose simply by time having elapsed. This is not hard to do; a theoretical model can be re-run with all parameters the same saving time-to-expiry which is fast-forwarded to the date of interest. Or for a quick estimate, traders can look at an equivalent option in a different expiration, assuming the implied volatility and relevant spot price are comparable. If the trader is long the April \$105 strike calls, the March \$105 strike could quickly indicate to what value the April calls may fall a month from now (again, other things being equal). Or for short term estimates, the trader could look at the option theta. If the theta is 5 (cents per

day), a week from now the calls will have lost something like 35 cents, although this depends on several factors not least the absolute time until expiry. Nevertheless, as a quick guide to an option's value over the short term, this may suffice.

The essential point is not to assume that if nothing else happens other than time passing that the option's value will be unchanged.

Failing to speak Greek

The aforementioned ways for directional traders to lose money on options unsuspectingly, come down to ignorance with respect to the factors that influence option values. But even if these factors

are appreciated, the trader can still slip up if he fails to realise how dynamic these risks are, relative to underlying risk. The point is that someone trading the underlying (an equities investor or a futures trader for instance) knows that various factors will cause the asset's value to rise and fall. Although understood in so far as whether such factors are positive or negative with respect to price, quantifying them with precision is generally not easy. Whereas with options, many of the known factors (such as the time to expiration) are known with certainty and the effect of them changing (e.g. time passing) can be quantified precisely. This is done via the Greeks. However, the basic Greeks are

themselves subject to change. A failure to understand this is a common cause of grief to directional traders who may have a little knowledge of the basic Greeks. For example, suppose a directional trader buys a short-term 25% delta, out-of-the-money call, expecting a \$1 rally in the underlying, which should yield at least a 25 cent profit, he reasons, other things being equal. A week or so later, the forecasted \$1 rally occurs, but the call has not increased in value by 25 cents. Why not? There could be a couple of reasons, but one contributing factor that is likely is that, this being a short-dated option, the delta has eroded over time. Delta (a first-order Greek) is itself influenced by

several factors, especially the passing of time and the rate of implied volatility.

The idea here is not that 'all options trading is more risky than perceived' or that 'directional trading without perfect theoretical knowledge is a fool's game'. Far from it. The assertion is rather that several surprises (welcome or unwelcome) are more predictable than might be imagined. If we tried to play a game of chess without knowing how all our pieces moved, we would put ourselves at a disadvantage. An unnecessary disadvantage. The theory of options is not wildly complicated and it does not require deep mathematical understanding. The directional trader

can, as we have stated, trade options with the simplest knowledge as to how they behave at expiration. And if he is profitable and happy with that setup, then great. But learning more about how options behave, comes at very little cost. The better they are understood, the less likely the trader is to enter into trades that are based on an elementary misunderstanding. The better equipped the trader is to risk-manage the position. And the easier it should be to distinguish real opportunities from false friends.

Ignoring option-specific risks

Much of the core option/Greek risk is directly comparable to the risk of other financial instruments. For example

option delta is often thought analogous to bond duration and option gamma likewise compared with bond convexity. And much of the standard risk management techniques that directional traders might apply to a portfolio of simple underlyings, are of course still relevant for options. Understanding the Greeks and knowing how to act on the data they offer will cover a large portion of the directional trader's risk management needs. However, there are also a number of option-specific risks that can prove the directional trader's undoing. To repeat, unless the trader is simply looking at the options from an 'at expiration' perspective, then it is not sensible to think of an option with a

certain delta as simply equivalent to a straight fractional portion of the underlying. Owning a (-)25% delta put is only the same as being short 0.25 of a lot of the underlying in a very limited sense. Now, a trader can understand much of the difference by learning about the Greeks. But there are also option-specific risks that do not affect the underlying in the same way and are perhaps not so well covered by the Greeks. These include the relevance of the inherently stop-start trading calendar for instance. The Greeks tell us how time's passing affects option value, but this relates to time passing smoothly. In practice, since options can only be traded when markets are open, time

passes in a staccato fashion. Several of these idiosyncrasies are detailed in the chapters that follow. Here, we just make the point that directional traders (again, we are speaking of those who are interested in more than just the expiry outcome of an option), can be caught out on such things. Read and digest the rest of this volume, is sound advice.

Exercise and expiration

Vanilla option contracts are relatively simple by nature. The owner has the right to exercise his option at expiration (for European options) or any time up to and including expiration date for American options. In most cases, it is entirely obvious whether or not an option should, rationally speaking, be exercised. And yet, the matters of exercising and expiration have proved the undoing of many a trader or even entire trading firms. There are two main

sources of loss making opportunities. One relates to the decision as to whether or not to exercise; the other relates to the actual administrative business of exercise and expiration. One might think that the decision is a simple one which probably involves checking for intrinsic value. But there are several factors that ought to be considered. Option expiration must be handled with care as the opportunities to lose large sums are many in number.

Exercising in-the-money options before expiration (with a caveat for stock options)

This is almost invariably a mistake as a simple example will demonstrate. The trader might reason (fallaciously) along the following lines. Suppose the spot is

trading at \$100 and the trader buys the \$110 calls for 50 cents. Now suppose the spot rallies, much to the trader's delight, to \$112 so that the calls are \$2 in-the-money. The options have some time until they expire but the trader fears that the market will drop again, so he decides to lock-in a profit of \$1.50 by exercising the calls and selling the resulting spot position. By exercising, he pays \$110 for the spot, which he then sells (to make his position flat) at the current price of \$112, yielding a \$2 profit, from which he must deduct the 50 cents initially paid for the calls.

Why is this, in all likelihood, naive trading? Because the calls are probably

worth more than \$2 in the market. This is because they presumably still have *extrinsic* value, as well as \$2 of intrinsic value. So the trader would be better off if he simply sold the calls to the option market, rather than exercising. Here is the crux of the matter: **exercising options early typically forgoes the extrinsic value.**

What about the case of an option that is so deep in-the-money that it has no extrinsic value? Suppose in the above example, the spot had rallied to \$150 and the calls become 100% delta calls with a value of \$40. The \$110 strike *puts* have a value of zero. There is no extrinsic value in either option. What

then is wrong with exercising these calls? The reason a professional trader would not do this is that although the extrinsic value is currently zero, there may still be time for this to change. And it is perfectly possible to capture this future extrinsic value whilst protecting against losses to the intrinsic value. This is achieved by hedging the calls 100% rather than selling the calls. Suppose the trader owns 100 of the calls in the example above and each call has a contract multiplier of 1. The trader sells 100 lots of the underlying at \$150 to delta hedge the calls perfectly. This locks in the \$40 of intrinsic profit, since if the spot rallies from here, the position makes no more profit (since it is now

delta neutral). Likewise, for declines in the spot price, the hedge offsets the losses from the calls one-for-one. However, notice what happens if the spot falls all the way back to \$100. Once the spot drops below the strike price (of \$110) the delta of the calls must be below 50%. Indeed, at expiration, their delta will be 0% with the spot below the strike. But the trader is still short 100 deltas from the hedge. So, below the strike, the trader is simply short 100 delta and will make profits. Above the strike, the trader is perfectly delta hedged. This happy situation occurs because the trader is synthetically long the \$110 *puts* for a *credit* of \$40 (minus the 50 cents paid for the calls

originally). This is basic put-call parity at work. Hedging a long call 100% creates a synthetic, naked long put position. Even if the spot does not drop below the strike, simply by returning to the strike, the puts will have extrinsic value (assuming sufficient time remains until expiration), which the trader could capture by selling the puts (to create a conversion position). If this is unclear, simply work through an example yourself, calculating the value of the option and any associated hedge, for various spot prices.

This demonstrates how exercising an option early to capture the intrinsic value can mean giving away both the

current extrinsic value *and* future increases extrinsic value. For traders who can hedge a long call position short using the underlying, this will often be a better way to lock in the profit *and* retain the latent potential of the position as a synthetic out-of-the-money put. Of course, this also applies for in-the-money long put positions (which can be hedged by buying the underlying to create a synthetic long out-of-the-money call position).

Exercising out-of-the-money options at expiration

This usually occurs as a result of a back-office or administrative error and it can prove highly expensive. Some exchanges

have added precautionary measures to deter members from making this mistake; but not all. There is almost never a good reason to exercise an out-of-the-money option at expiration; by definition, exercising these options leads to a trade in the underlying which is automatically loss-making. There may be some rare exceptions to this rule, most commonly where a trader exercises an option which is only slightly out-of-the-money because he has no access to the underlying market; this sometimes happens for example when options can still be exercised *after* the market in the underlying has closed. For instance, suppose the underlying market closes at 6pm but options can be exercised on the

day of expiry until 7pm. Now suppose the trader observes a sharp movement in the price of a product which is closely correlated with the underlying product of his options and is still open for trading. He *may* decide that it is likely that the underlying product of his options will also move sharply when it re-opens and so although his options are technically out-of-the-money, there is a sense in which they may really be considered in-the-money, given where the underlying *ought* to trade when it re-opens. However, this is obviously a pretty special case and is rarely if ever guaranteed to be true.

By far the most likely reason for

someone having exercised out-of-the-money options is human error. Such mistakes can be wildly expensive as the exercise may lead to the trader buying the underlying at a strike price far above the current trade price or selling at a strike price far below. As to how this situation plays out; some exchanges may arbitrarily decide to intervene or even reverse the exercise. In some cases they may contact the (deliriously happy) trader who has been assigned and ask him or her to kindly allow the exercise to be reversed. Frantic telephone calling overnight or the following morning is the order of the day.

Safety measures to prevent the exercise

of out-of-the-money options at expiration cannot be too stringent. Of all the potential disasters described in this volume, this is one of the most spectacular. Avoid.

Not exercising in-the-money options

The equally ugly sibling of ‘exercising out-of-the-money options’. Failing to exercise an in-the-money option is like failing to claim the prize from a winning lottery ticket. Some exchanges have automatic exercise in place for in-the-money options to avoid this issue. But it should never be left to chance. Failing to exercise a deep in-the-money option would be very unpleasant as potential gains are thrown away. But if the option

has been delta-hedged the situation is even worse as losses from the hedge will be locked in, without the counterbalancing profits from the winning option.

Ignoring pin risk

“Expiring around the \$100 strike? That’s fine; I’m net flat that strike...”

Put-call parity means that traders will often equate puts and calls of the same strike, from a risk perspective. So much so that when looking at their inventory they will often simply look at the “Net position” column. This typically sums the longs, and subtracts the shorts, of equal expiration and strike. For instance, if a trader is long 500 lots of the March

110 calls and short 275 of the March 110 puts, his Net Position is long 225. Put-call parity holds perfectly whenever interest rate and dividend yield considerations can be ignored. It also holds, regardless of the interest rate/dividend situation, as expiry approaches. It is highly convenient in a complex portfolio involving many calls and puts of different strikes, to focus on the Net position column, especially since so much of the risk relating to puts and calls of equal strikes is shared. However, there is one particular risk relating to calls and puts of equal strikes at expiration which is an exception; pin risk.

Pin risk is a risk associated with expiration when the underlying product is hovering close to or at a particular option strike price. For instance, suppose the spot is trading at \$100.01 at the time of expiry; the market is 'pinned' against the \$100.00 strike in the option market. In this case, it is obvious that the \$99 strike calls and say the \$105 puts will be exercised. But the case for the \$100 strike calls *and* puts is unclear. True, the calls are 1 cent in-the-money and the puts are 1 cent out-of-the-money. However, the owner(s) of these options may not worry about the penny and decide to exercise the puts (in part or full) or *not* exercise the calls, contrary to what basic logic dictates. The reasons

for this are usually similar to those outlined above (whereby the trader has a reason to believe that the spot product will be trading at a different price when it re-opens, perhaps because a similar, correlated product is still open for trading and has moved). How can this hurt the trader who is assigned (or not assigned), against his expectations? Usually it hurts because the resulting position in the underlying is unexpected. The trader may have had no delta hedge when it transpires one was required. Or it could be that an associated delta hedge was actually not required and therefore becomes an outright position, not a hedge. Suppose a trader is short the (barely) in-the-money calls and he has

hedged this 100% by buying the underlying; he expects to be assigned on the calls, meaning he must deliver the spot and so his hedge serves that purpose. This leaves him positionally flat when the dust settles. However, if he is unexpectedly not assigned on all of the calls, he is left holding too many lots of the underlying. This becomes a net delta position which was probably not desired.

What can be done about pin risk? Traders will often look to find counterparties with opposing conversions on their books and trade out of the pins at fair (i.e. zero) value. However if there is a bias in the market

between those who are willing to trade out and those who won't, this can lead to pins trading at a premium. (Conversions should have a value of zero at or close to expiration). For instance suppose a trader is short 1000 lots of the \$100 calls and long 1000 lots of the \$100 puts, all delta-hedged. He tries to find counterparties willing to trade the conversion by selling calls, buying puts and buying underlying, but has no luck. He may in this case have to *pay* something, perhaps a tick or two (for something theoretically worthless), to encourage someone else to take on the pin risk.

If trading out of pins at fair value is not

an option, and paying a tick or two is expensive, the trader is usually left leaving things to fate. Some traders employ a strategy of assuming they will be assigned on a fraction of their short, pinned options rather than the whole quantity; they will adjust their delta-hedge accordingly. However there are no hard and fast rules here.

Pin risk applies whether a position is delta-hedged or not. If a trader is short any pinned options at expiration, he may or may not have a position in the underlying to deal with when the expiration process has been completed. This is a risk over which the trader has no real control. Trading out of the

position prior to expiry is the only complete safe-guard. The cost of this must be weighed against the magnitude of the risk; experience is slightly helpful in this regard.

One particular nefarious example of pin risk that the author was exposed to: a large player in the market got wind of his being one side of a conversion whilst the market makers were almost all on the other. The cunning trader also realised that the magnitude of the positions in question was large relative to the typical liquidity (on the open at least) of the underlying market. The market duly pinned, with the trader's long put options settling slightly out-of-the-

money. He exercised his position regardless and the market makers all found themselves carrying long delta positions, which is something they rarely enjoy. The following day, in the opening auction, the option market makers all attempted to liquidate their long deltas by selling the underlying. This drove the price of the underlying down, which was happy news for the chap who was of course short, having exercised his puts. Having deeper pockets than the market makers, the trader was able to buy back his deltas at a profit and in a more leisurely fashion.

Delta mis-management

Showing too tight a market when the spot is insufficiently liquid

A client calls for a price in some options. She wants the price to be a 'risk' (also known as a 'live') price, meaning that the price must tradeable in real time with no associated delta hedge. This is straight options trading. The sales trader who is responsible for taking the orders from clients turns to his trader colleague who values the options against the current spot price and then decides the price to show. The sales

trader serves it up to the client who keeps him holding on the line. She then shouts "I'll buy 10,000" and the sales trader in turn shouts "Mine! 10,000!" at his trader. The trader shouts "Filled!". The trade is done and the adrenaline is pumping.

The trader then spins round to delta-hedge the options in the spot market. He checks the option delta and sees it is 30%. The option multiplier is 1, so he needs to trade 3,000 lots of the underlying. He then checks the spot market and to his horror realises that it is very thin. Only 100 lots on the best bid, and 50 on the best offer. To trade 3,000 lots would push the market

substantially. This is bad news because, if you look back at what happened, the trader made his price *against a particular spot price*. Only if he can delta hedge against that spot price or better is he assured of capturing the profit from the trade that he expected. The trader now has a horrible dilemma. The option trade is effectively flapping in the spot market wind. If he hedges, given the lack of liquidity, he will push the market against himself. If he fails to hedge, the market could move against him in any case and he still won't be hedged against further moves.

This scenario can be avoided quite simply, assuming the client is a

reasonable person. What should happen is that the trader makes the price contingent on him being able to hedge at the current spot price. This reverses the order in which things happen; the delta hedge actually precedes the option trade. So what tends to occur is that the client will say "Okay, I'd like to buy 10,000" and the trader will then say "Fine, I will work my delta hedge and fill your order as I get filled on my delta hedge". Then the trader puts his delta hedge into the order book (probably in small clip sizes in this example to avoid scaring the market). For every 100 lots he trades in the spot market, he is able to fill the client on 300 options (given the 30% delta). Typically the trader will give the

client updates on how much of the order has been completed.

If the client is unreasonable and demands to be filled on the 10,000 lots regardless of the spot market liquidity, it becomes a matter for the trader to decide whether there is enough edge in the option trade to justify the risk he is running by not having the full delta-hedge available.

Texan delta hedging

Texan Delta hedging is a classic rookie trader mistake, but one that even experienced traders can make if their concentration slips. It is quite simply a

hedge that is executed in reverse and leaves the exposure doubled rather than neutralised. Suppose a trader is long the underlying and wishes to hedge by trading futures on the underlying. If he accidentally buys rather than sells futures, then this is a Texan hedge. Rather than eliminating his risk, he has doubled it. In the options world, the most common occurrence is for calls or puts to be delta-hedged in the wrong direction. Buying calls and buying the spot. Or selling puts and buying the spot. Or the other two combinations which probably should be left unspoken.

The author knew of a junior trader who had just executed his first option trade.

He bought 100 calls from a client. Naturally enough, he was rather excited by the situation, this being his debut trade. The senior trader on the desk told him to remain calm and just delta hedge the calls, which had only a 20% delta. So the junior should have just turned to the underlying market (a futures market in this case as these were options on futures) and sold 20 futures. Alas, 5 minutes later the senior trader noticed that the junior was working an order to try to sell 60 futures! When questioned on what on earth was happening the junior trader explained that instead of selling 20 futures he had bought. This was a classic Texan hedge. The junior trader realised his mistake. He should

have immediately confessed the error, but decided instead to correct it for himself. However, now losing all composure, he heaped misery on misery by Texan hedging his Texan hedge! Instead of selling the 20 futures he had mistakenly bought, he bought 20 more. This meant he was now long 40 futures when he should have been short 20. And this was how he came to be trying to sell 60 futures when the senior trader became alert to the situation.

To avoid Texan hedging, be sure to concentrate. The Volcube simulator has minigames dedicated to hedging so that this skill can be learnt and the chances of a mistake are reduced. But if and when a

trader does Texan hedge, he should take a deep breath and be sure not to compound his crimes by Texan hedging the Texan hedge!

Running a delta hedge over an announcement

Depending on trading style, option traders will delta hedge in different ways. Some will immediately hit the bid or lift the offer in the underlying market, not concerning themselves with the fact that in so doing they are crossing the bid-ask spread and giving away edge to market makers in the underlying. Others, will take a more nuanced approach and try to 'work' their delta hedge to try to avoid giving away profits. To the author's knowledge, no conclusive study

has emerged to determine whether either strategy is more efficient. However, if one decides on the latter approach, one ought to be aware of the risk of running a delta hedge over a scheduled announcement. If the trader is just trying to capture an extra tick or two from the delta hedge by working the bid or the offer, rather than crossing the bid-ask to trade, then this makes little sense if a scheduled announcement is about to occur. For instance, if an economic data release is due on say unemployment at 8.30am, then working a delta hedge close to the bid or offer at 8.29am, may not be sensible. This is because the underlying might be about to move substantially. True, it could move in the

trader's favour, but in reality few traders take a position based on the outcome of such data releases which are inherently unpredictable. The point is that the trader is only usually attempting to save a relatively small amount by not delta-hedging immediately. So to carry this risk into an announcement does not often make for a sensible risk-reward profile as the potentially downside increases greatly. Even less forgivable is when a trader forgets about a forthcoming announcement. This is simply down to a lack of planning or awareness. It is extremely irritating when it happens, but it is preventable, either by keeping a closer eye on the calendar or not working hedges for too long.

Unscheduled announcements are of course not knowable in advance, but they do constitute one of the hazards of working a delta hedge rather than executing one immediately.

Gamma Trading

Gamma trading is explained in detail in Volume I of this series, *Option Gamma Trading*, so please refer there for a full guide to the whys and wherefores. In this volume, we assume gamma trading and gamma hedging as concepts are understood by the reader and will outline some of the common traps into which an innocent trader might fall.

Not working a long gamma hedge

One of the most infuriating missed

chances for the long gamma player is a shock move and immediate reversal when no gamma hedges were being worked in the market. In plainer English, the long gamma trader is looking for the price of the underlying to move; the further and quicker, the better. He can then gamma hedge and hopefully lock in a profit. Now, if the trader is indeed long gamma then a sudden sharp move in one direction can be a fantastically profitable thing, *if* the trader gamma hedges. However, sometimes such moves can occur in dramatic fashion and revert to the previous price *before the trader has time to gamma hedge*. This is intensely irritating. Suppose the spot is trading at \$100 and the trader is long

gamma. Suppose further that for every \$1 fall in the spot price, the trader becomes shorter x deltas, due to his long gamma. Finally, suppose the trader is hoping to gamma hedge if the spot drops to \$99 as this will be sufficient for him to cover his daily theta 'bill'. Imagine the frustration if the spot plummets to \$95 and then immediately retraces to \$100, without the trader gamma hedging. This could be for instance because of an enormous sell order or perhaps an erroneous announcement that is swiftly retracted. The trader could have covered his daily theta bill several times over, since gamma profits are exponential. So the profit would not have been 5 times 1 day of theta given a \$5 drop, but

something closer to 25 times the profit.

This unhappy state of affairs could of course have been avoided if the trader had been working an order, or several orders at different prices, in the underlying. By leaving resting orders, the trader would have been 'filled' during such a 'flash crash' and in the event of an immediate retracement he could simply have sold the gamma hedges back out for a clean, scalping profit.

Such moves might be rare. Perhaps only once in a year or every few years. And diligence is required to manage, and not forget, the resting orders. However, this

hard work can occasionally mean a big payoff for no extra risk. Indeed, it is merely maximising the opportunities inherent in a long gamma portfolio. Care must be taken with this procedure though, to avoid the following mistakes...

Working a gamma hedge (after the gamma has been sold)

Continuing to work gamma hedges after gamma has been sold is a fairly common mistake. The trader was long gamma but sells options and hence the gamma vanishes. The erstwhile working gamma hedge orders are forgotten about until the market moves sharply and suddenly the trader is being filled on trades in the underlying market, the reason for which

he knows not why. This can be particularly costly in the case of a sudden crash or spike in the spot which drives the market well through the trader's orders. Reversing the trades will in such cases come at a cost. The solution is simple enough to state. If a trader is in the (often good) habit of working gamma hedges, he must remember to pull these gamma hedges from his working order book when they are no longer appropriate. Most obviously, if the trader has no gamma, no gamma hedges ought he to be working.

Working a gamma hedge without checking the position Speed

A related mistake is to ignore changes in the position gamma with respect to the

spot price (a third order Greek sometimes known as Speed). For instance, suppose a trader is long 100 gamma with the spot trading at \$50. The trader decides to work a gamma hedge 1 point below and above the current spot price and so enters orders to pay \$49 for 100 lots of the underlying and to sell 100 lots at \$51. However, suppose that the trader is short wing options, such that his gamma changes rapidly for changes in the spot price. Suppose in fact that very quickly the position will be short gamma for changes in the spot price. The Speed of the position is negative. Whereas the trader, with his hasty approximation, assumed that his gamma was constant. The gamma hedges he is working are

almost certainly inappropriate in magnitude and possibly even in direction, if his position becomes short gamma quickly enough. The solution to this problem is also simple. The trader must take care to analyse his Greek risk carefully using a Risk Matrix which will show how his gamma and delta change for changes in the spot price. This shows how the position Speed will take effect and the trader has a much clearer idea of how to gamma hedge appropriately. Never assume that a portfolio's Greeks are constant for even moderate changes in the spot price.

Ignoring large technical support/resistance with gamma hedges

Technical analysis is the study of price

charts with the aim of uncovering recognised patterns that are believed to contain predictive power with respect to future price movements. Futures traders are often keen students of technical analysis. Whereas option traders are, on average, less interested or experienced with respect to technical analysis. An important component of technical analysis is the 'level'. A level is a price which is expected to prove harder for the price to pass through relative to other prices. A level below the current price is referred to as a 'support level'; a level above is known as a 'resistance level'. For instance, if the underlying is trading at \$100, there might be an 'important' technical support level at,

say, \$99.27 and a resistance level at \$102.35. There could be additional support below at, say, \$98.79 and resistance above at \$104. If the price approaches these levels, the idea is that there will be additional buyers at the support price and additional sellers at the resistance level, thus making it harder for the market to push through these prices.

Who decides these levels and how? Technical traders use different methods involving statistical or charting procedures to determine their levels. Sometimes these levels coincide; sometimes not. Well-known traders or investment bank trading desks will often

publish their predicted levels. Other traders may incorporate this information into their own estimates and therefore a gradual merging of levels in the public sphere may occur.

Turning to the option market. Option traders, as mentioned, are often somewhat less focussed on, or trained to notice, technical levels. This can be a weakness, especially when they are *de facto* traders in the underlying due to a gamma position. Option traders who need to hedge gamma (whether they are long or short gamma) will often decide on a price point at which they intend to hedge. This could be based on some multiple of the expected standard

deviation of the underlying or it could be based on a simple %age movement. Whatever the selection method, it is often unwise to ignore prevalent technical levels when choosing these gamma hedging points.

For instance, suppose a trader is long gamma and the spot is trading at \$100.56. If the spot falls to around \$100, he will be short 400 deltas which he intends to hedge by buying 400 lots of the underlying. So he adds an order to buy 400 lots, paying \$100.00. Suppose further that there is a 'massive' technical support level at \$100.01, which has been predicted by many traders in the underlying market for several months.

The market drifts down towards \$100.00, trades in small size at \$100.01 but then hits the support wall and sharply rebounds back up to \$100.56 where it remains for the rest of the day.

This scenario is fairly common. The option trader did a couple of things that were, and not only in hindsight, not particularly clever. The result has been that he missed his long gamma hedge completely and he has foregone scalping profits. Silly thing number 1 was to ignore the technical support level which was well-broadcast. Had he moved his gamma hedge up to say \$100.02 (and slightly reduced the quantity bought, since he would not have been as short

delta at this price), he would probably have had a disproportionately better chance of a happier outcome. If the support level does indeed prove a sticking point for the underlying, then it may well make sense to move the gamma hedge slightly north of the support level (or south of a resistance level) to increase the chances of a fill. The second silly thing, on the surface at least, was to work \$100.00 which in purely psychological terms is likely to form its own technical level. For superstitious reasons or others, prices such as “100.00” or “3000” in an index, often seem to form technical levels. To the author’s knowledge, no study has been performed to confirm or refute this being

the case, but for the sake of a tick, it hardly seems worth the risk.

So one solution is for the option trader to have greater awareness of the technical reports circulating in his market.

Putting all the gamma hedge eggs in a single basket

A trader has a large short gamma position. He decides on a stop-loss strategy for his short gamma hedges. So he picks a price below and a price above the spot's opening price for the day where he will fully gamma hedge the position. Sadly, the underlying price starts to fall and hits his stop price. The trader shows discipline and sells his

long deltas as a short gamma hedge and locks in the loss. But the price he chose as a stop turns out to be the low for the day. The underlying then starts to rally back up and reaches the open price again, at which point the trader buys back all the deltas, completing a loss-making scalp. It gets worse; the underlying continues its rally to the upside stop-loss point and the trader fully negative-gamma hedges his position on the upside. Alas, this turns out to be the high for the day as the spot drifts off and finishes the day unchanged.

This is a story to give short gamma traders nightmares, and it would be truly unfortunate. For the long gamma player,

an equivalent would be where the underlying trades down to 1 tick *above* the working gamma hedge and then trades all the way up to 1 tick below the working upside gamma hedge order; meaning he executed no gamma hedges at all despite the underlying moving to within 1 tick of two of his hedge levels. However, a simple adjustment to the trader's strategy would have avoided a lot of the pain. When a trader has a relatively large gamma hedge (either positive or negative) to execute, then it can make sense to break the hedge down into smaller orders worked over different prices in the underlying. Suppose in the above short gamma example, the trader had said "I will

short-gamma hedge if the spot falls to \$100.02. So I will sell half the deltas at \$100.03 and the remaining half at \$100.01". The result would have been that the trader only short gamma-hedged half the deltas (at \$100.03), since \$100.02 was the low price. The 'cost' of this solution can be quite small (a tick or two extra on the price) but the quantities being halved mean the saving can be large. If averaging the hedge over two trades the cost (or benefit depending on whether the player is looking at a long or short gamma hedge) is that the first gamma hedge is more likely and the second less likely. So for the short player, he is more likely to have to short gamma hedge in this scenario (because

\$100.03 would be reached before \$100.02), albeit only as half a hedge. For the long player, he is less likely to achieve his complete gamma hedge (he needs the underlying to reach \$100.01 now instead of \$100.02). But the benefits can make this worthwhile. Missing a large, long gamma hedge by a tick is one of the most irritating things in options trading. Likewise, fully short gamma hedging when the stop is triggered by just one tick. Averaging over two, three or more orders (sometimes weighting the quantities differently to centre the hedge more fully on one price) can claw something back in this case and avoid the all-eggs-in-one-basket payoff profile.

Switch Gamma

“Switch Gamma” is not a well-known phrase, even amongst option traders, although it is the only one the author has ever heard used to describe the following situation. It is relevant in scenarios where a trader owns a gamma position via options on one futures expiration underlying but is gamma hedging using more liquid features in a different expiration. For instance, suppose in January a trader buys straddles in June options which are based on June futures. This renders him long gamma. However, suppose that the June futures are not at all liquid and he

will be gamma hedging with March futures. This will lead to the trader deriving a synthetic futures spread position. To see this, imagine the March futures rally and suppose that the June futures tag along. Futures movements are often correlated so this is not unexpected and of course it is the main reason why the trader is happy to hedge June deltas with March futures. However, the spread between the March and June futures may not be static. With the futures at one price, the spread might be x ticks. But after a rally it might be $x+y$. After a drop, it might be $x-y$. What we are talking about here is essentially a change in the term structure or the futures curve.

This can matter to the option gamma trader. Suppose the trader is long gamma; if the futures rally, he will need to sell deltas. This will leave a short exposure in the near term future and a long delta exposure in the longer dated month. So the trader has assumed a synthetic short futures spread position. This could be a significant problem if the futures spread price is known to have a delta; i.e. if its value is known to vary in a particular way with the futures price. Suppose that the March-June futures spread increases roughly by 2 ticks for every 30 ticks that the March future rallies. This means the option trader will be losing roughly 2 ticks if he gamma hedges in a rally using the March

future. In some cases, the synthetic delta positions being accumulated by options traders in the longer dated months can exceed the open inventory in the futures spread market. This is quite likely to lead to a situation where the futures spread is pushed around by the options market. For options traders (especially market makers) this more often than not works against their interest.

One extraordinary example of switch gamma involved a shock move in the near term futures and no move whatsoever in the back month futures. An options trader who owned gamma from the back month options, gamma hedged his position *as if the futures*

spread had not changed. In reality, the underlying for his options had not moved a single tick, but, failing to notice this fact, he hedged using front month futures as if it had moved by the full amount. Alas, he did not stop there. He saw that the price of volatility and gamma had spiked higher because of the move, so he decided to sell out his long gamma to lock in more profit. He sold some front month options (straddles). Sadly, at this point, he realised that the back month futures had not in fact moved and nor had back month implied volatility risen. The net result was that he had a massive (and unrequired) delta position in the front month futures and he was now also short front month gamma. The front

month futures continued to gyrate wildly for the rest of the day and the trader racked up horrible losses on a day he thought had started so promisingly.

The ‘problem’ of switch gamma is not an easy one to get around. It just needs to be something that traders factor into their trading decisions. They simply need to remember that the most liquid hedge may not be 100% correlated with their options delta and that the synthetic futures spreads that may result can move against their interests. But the anecdote above shows how, *in extremis*, it can be a significant risk to guard against.

Not gamma hedging after selling the gamma

A trader is long gamma from some delta-hedged calls. The spot market drops sharply, meaning the trader becomes shorter delta, but he does not gamma hedge, intending to keep running the short position. Implied volatility/option prices spike up sharply and the trader sees a good bid in the calls, (hedged with their current delta), he owns, so he sells out to lock in the vega profits. The trader's theoretical profit at this point looks good. The spot market then rallies sharply back to its initial level. The trader loses money! How so?

The trader should have gamma hedged as soon as he sold out the calls. Apply some numbers to see why. Suppose the

calls were at-the-money (50% delta) and the trader owned 100 and was short 50 deltas against the calls in consequence. Suppose when the market fell, the delta of the calls dropped to 30%. The trader had sold 50 deltas and now the calls are only providing a long of 30 deltas, leaving him net short 20 deltas; good news given the market has dropped. This is a simple gamma effect. But when he sold the calls as a delta-hedged trade, he only bought back 30 of the deltas. He should have cleaned up the position by buying back the outstanding 20 deltas. Sadly he did not and he carried this short position up as the spot rallied.

The point is that if a trader has a delta

position because he has a gamma position, the spot has moved and he has not gamma hedged, then this delta will vanish if the spot retraces (because the trader still has the gamma position to reverse the delta). But if, after the spot moves, the trader sells his gamma, then there is nothing thereafter to change the portfolio delta. After the gamma has gone, the delta position is simply a naked delta position. To avoid assuming this extra risk, simply remember to gamma hedge when the gamma has been sold. If half the gamma is sold via a trade, hedge at least half the deltas.

Volatility trading

Volatility trading is more of a professional's pursuit, but not exclusively so. Retail traders are increasingly interested in volatility trading strategies and can use options for the purpose. Whilst volatility-based ETFs and futures have their uses, they are certainly not without their foibles. Trading options as volatility plays remains the purest form of volatility trading (excluding perhaps variance swaps, which are still an over-the-

counter niche within the volatility niche). Some of the following pitfalls are of relevance to the professional vol trader or options market maker, whereas others are available for all to 'enjoy'.

Judging the price of volatility in differing units

The price or level of volatility can be measured in different ways. One must take care not to confuse the units or make judgements that are inconsistent simply because the units (or, frames of reference) are different. That all sounds rather theoretical so let's take a simple example. Consider a situation where the spot is trading at \$100 and the underlying market price has an annualised volatility of around 25%. The

option market is showing a one week straddle at \$2.76, a one month straddle price of \$5.70 and a three month straddle at \$10. Remember that at-the-money straddle prices are often used as indicators of volatility prices because at the current spot price they have no real directional bias (i.e. no delta); their value is dominated by the implied volatility and the time remaining until expiration. Looking at those three straddle prices, ask yourself how they appear to you. Bear in mind that a 25% annual volatility implies a *daily* standard deviation of around \$1.58 around the current price of \$100. Assuming normally distributed returns (and yes, we understand that that does

not always hold true), then we would expect to see a move in the underlying of around this magnitude on, very roughly, two thirds of days. Does that make a one week straddle seem cheap or rich at \$2.76? Does the three month straddle sound high or low at \$10? A 10% move in the underlying within three months would be needed to push this straddle in-the-money; is that likely or unlikely given the annual volatility?

You may not have any intuitive response to this question given the numbers mentioned but in the author's experience, otherwise sensible traders have a hard time answering rationally and consistently. The above situation was

something of a set-up; in fact all were derived from a theoretical pricing model using 25% implied volatility. In other words, all three straddles should have been 'fairly' priced relative to the prevailing market price. If none of the straddles struck you as expensive or cheap, that is probably a good thing. But if you were drawn to one as being good value relative to the others, do not despair. These kinds of comparisons are notoriously difficult because the units are not truly comparable, and yet on the face of it they are perfectly so since all the straddles are priced in basic currency! Comparing straddle prices across expirations (i.e. straddle calendars) is all but impossible without

additional parameters or the ability to make 'square root of time' adjustments in one's head. Comparing straddles to the daily standard deviation (or indeed any other non-annual standard deviation) is also perilous. Anecdotally, traders tend to perceive short term straddle prices in dollars as cheap. A possible reason for this is that volatility is about prices dispersing in either direction, whereas straddles require a concerted move in one direction to become in-the-money. So, a product moving roughly \$1.58 on more days than it does not, might lead a trader to conclude the one-week straddle is cheap at \$2.76; all that is needed is a two 'average' moves in the same direction and the straddle will

leap in-the-money. This overlooks the fact that volatility generally involves ups and downs, advances and retracements.

To avoid falling into this trap, compare like with like. Rather than comparing a dollar straddle price to the dollar daily standard deviation, the trader could compute the relevant standard deviation. For instance, the one-week standard deviation is calculated as $[\text{spot price} * \text{annualised implied volatility} / \sqrt{52}]$. Far more common however is to look at the implied volatility of the straddle and compare to the annualised actual volatility (however the trader chooses to measure the latter). Likewise when comparing straddles across the curve

with one another. Implied volatility levels are inherently normalised and therefore make comparison safer.

Leaving a resting offer/using the wrong delta in a vol trade when spot has moved

Option trades can be accompanied by a delta hedge and these are known as ‘vol’ or ‘tied’ trades. For instance, a trade might involve the “106 strike calls versus 100.45 in the underlying and a 30% delta”. This means that anyone buying the calls will also be selling the underlying at a price of \$100.45, at a rate of 3 lots for every 10 options traded (assuming a contract multiplier of 1). Let us suppose that a trader leaves a resting order in just such a vol trade, when the spot is trading close to 100.45. Now let

us suppose the spot market drops considerably to \$99 (and assume that a daily standard deviation of only 50 cents was expected). Another trader comes to buy the calls versus the spot price of 100.45. And no wonder. By buying the calls at the much higher spot price, the trader will make instant profits from the large move away from the reference price of the trade. He will be able to make an instantaneous gamma hedge for a profit. We can assume the delta of the calls versus \$99 is far lower than 30%; let's say 10%. This means the trader will simply 'take a turn' on 20% of the vol trade deltas which he sold at \$100.45 via the vol trade and can buy back immediately for \$99 in the market.

A similar problem would occur if the vol trade had been accompanied by the 'wrong' delta. Traders who would like to maintain the ability to wriggle out of the vol trade may sometimes not declare the percentage delta to be used at the time of making the quote; in other words, just show the price versus the spot price reference without specifying the delta. When someone comes to trade, they can be, in essence, fobbed off, by demanding an unrealistic delta, such as say 25% in the above case.

Several solutions to this problem exist. Firstly, always be aware of the current spot price. Do not presume that because a trade is a vol trade (that comes with

the spot at a fixed price) that the spot price is therefore irrelevant. If the spot has moved, the gamma of the options may have greatly altered the delta and the vol trade may no longer be a good idea. Secondly, put a vol trade/price 'under reference'. In the case above for example, this may take the form of saying that the price is reliable so long as the underlying is trading above \$100. A third solution is to agree to trade but with the current option delta. In the contrived case above, the delta hedge would only be 10%, not 30%. This prevents the seller losing out immediately from effectively making a short gamma hedge.

Showing too high a bid in long dated options after a shock

An old trick is for a trader to request a quote in a long-dated option after a severe short-term shock. Suppose an event causes the stock market to tumble 4% in a single session. Assuming prior to this the market had been relatively calm, this will cause a very sharp rise in near-term equity implied volatility and option prices will rise dramatically. A trader is then asked for a price in a 5 year option where liquidity is low and there are no auto-quoted prices in the electronic order book to act as a guide. The risk here is that the trader over-reacts to what could be a very short term effect (forgotten by tomorrow or within

a week say) but he effectively bids for the long dated options as if the effect of the change will continue to be felt *throughout the five years of the option's life*. Perhaps the event really was a permanent structural change in the world that means nothing will ever be the same and 5 year option implied volatility should be marked significantly higher. But this is almost never the case. More often than not, the trader requesting the price in this scenario is an opportunist looking for someone to over-pay for long dated options on the back of short term news. Traders should be aware of the phenomenon if making prices. They should also be wary of acting irrationally and over-paying for long-

dated options if they are 'caught short' options in such a flash-crash situation. If a trader is short near-term options when near-term volatility explodes, then over-paying for longer term options is often a desperate and ultimately self-defeating act. Whoever suggested that when stopping out a short position, one should be sure to buy back the exact shorts and not a hoped-for proxy, was probably on to something.

Auto-quoting/leaving resting orders over a scheduled announcement

For traders who use auto-quoting machines to show prices in the market or who use black-box algo trading systems, or who leave resting orders with brokers, scheduled economic

announcements can be a risk. The market has a better than normal chance of moving violently and machines may be too slow to update, leaving the trader exposed to being picked off by faster machines. Resting orders could also be filled but at a price which could have been bettered had they not been left in the market.

This is a simple matter of concentration and planning. Be aware of the trading calendar and schedule for economic and corporate announcements. Set alerts and reminders for key events. Try to ensure that if the worst does happen and you are unexpectedly filled on an order, you will be ready to hedge appropriately.

Miscellaneous Option Landmines

Trading stock option conversions when
something has happened

Options on a single name equity (stock
options) have several risk
idiosyncrasies peculiar only to them.

Many of these like to hide their poison in an apparently juicy apple of a conversion trading opportunity. The equity options trader should therefore always be on special alert when he notices the price of the conversion moving suddenly.

A conversion is a call traded against a put (same strike, expiration and underlying), all traded against the underlying. For instance, buy the at-the-money call, sell the at-the-money put and sell the underlying share in equal measure (adjusted for the option contract multiplier). Technically, the *conversion* usually relates to a long call-short put-short underlying situation; the opposite

being a *reversal*. Although conversion can be used to mean this too, as can ‘the synthetic’. Even more confusingly, sometimes these terms are used for the same strategy *without* the stock hedge. For simplicity, here we will just use ‘conversion’ to mean any call-versus-same-strike-put strategy, accompanied by a full delta hedge.

The conversion is delta neutral. In the simplest case of say futures options, the conversion is usually risk free in every regards except pin risk. Put-call parity in its simplest form applies; the only difference between the value of a call and put of equal strike and expiration is the intrinsic value. In such cases, the

value of the conversion is zero. However in the case of stock options, there are several factors that can affect the value of the conversion. Of particular importance are i) the expected dividend the stock will yield ii) the prevailing interest rates, iii) the borrow rate for the stock and iv) special situations.

A classic trading mistake is to suddenly see 'opportunity' in trading the conversion for a 'risk-free' profit. In almost all cases, the conversion is trading where it is for a reason. Unless of course you are reading this before about 1984, in which case it probably is real edge and you should trade as many

conversions as your broker will allow. For everyone else, here are some common reasons for a change in the conversion value/market price.

Trading when a dividend announcement has been made

Stock option prices must incorporate future dividends. These of course are not always known with certainty. So the market uses its best guess. However, an announcement from the company in question which differs markedly from the current estimate can cause a sudden shift in option conversions. One indication that such an announcement is the cause of the conversion shift is that options that expire before the record

date for the dividend are *unaffected* by the news. And, typically, longer dated options can be disproportionately affected. This is because the news about one (say, quarterly) dividend may mean that dividends over the longer term are also re-evaluated. Hence, longer dated conversions may well move by more than nearer term conversions.

Not updating the rate curve after an interest rate decision/shift in the yield curve

A factor in the theoretical pricing of cash-based options is the prevailing and relevant interest rate. One way to understand the impact is as follows. Stock options are not (contrary to many people's expectations) valued

mathematically using the current share price. Instead the *forward* share price is used. This is the share price which is expected to occur at the option's expiration, given current interest rates and dividend yields. In theory, (and this is pretty dry, but stick with it), shares are riskier than the risk-free interest rate, so they should rally by at least the amount of the interest rate available. Therefore a call option will be slightly more valuable using the forward share price rather than the current share price (since the forward 'spot' will be higher, assuming positive interest rates). Puts will be slightly less valuable. Now to the main point; if interest rates jump, this will cause the conversion to move (since

calls will change value in one direction, puts in the other). Traders who are modelling option prices must keep their yield curve estimates up-to-date. Usually this is done by watching the relevant short term interest rate futures markets (STIRS: Eurodollar, Euribor, Short Sterling etc.). So here is the accident waiting to happen; the unsuspecting option trader notices calls trading at a premium and puts at a discount. “Fantastic”, he says, “I can trade risk-free conversions for a profit!” Steady there. Check the interest rate futures market first and ensure the yield curve inputted to your model makes sense.

Trading when a stock has gone hard to borrow

Another situation where the conversion seems out-of-line with expectations is when the underlying product has become 'hard to borrow'. This one is certainly more technical and harder to spot than most, but it is very often the explanation when the conversion has moved by a large amount. When the trader has checked his model for expected dividends and current interest rates, this is often the next item on the list. Here is the explanation. In order for hedge funds or institutional investors to sell a stock short, they need to borrow the stock from someone who owns it. Typically long players (such as investment trusts or pension funds) will own the stock for the

longer term and are prepared to lend it, for a fee, to people who wish to sell it short. The long player does this to generate some extra income (via the lending fee). It has been argued that it is slightly nonsensical to lend your long stock position to somebody whose only intention is to drive the price of it down. The counter-argument is that if the long player has sufficient faith in the fundamental value of the stock, then he should believe that the short seller will come unstuck and therefore collecting the lending fee is just an extra bonus. Notwithstanding this, the key point from the option market's perspective is that there exists a separate market in the 'stock borrow'. This matters because so

many option trades are delta-hedged by selling the stock short. And this affects the price of the conversion. To see this, imagine a trader buys the at-the-money call and delta hedges, in order to have the trade as a volatility play. He will be selling the stock to delta hedge. Whereas he could have bought the at-the-money put and then delta hedged by *buying* the stock. Now suppose that the supply of stock being lent by long players falls. This can happen for various reasons but essentially it is when the owners of the shares want to physically hold the shares rather than own them but have them loaned out. The result can be that the price of borrowing the stock (which is usually an annualized percentage of the

value of the stock) can rise. This will tend to make calls cheaper and the associated puts more expensive, other things being equal. In other words, the conversion shifts. The reason is that delta-hedging the calls is now a more expensive matter than delta-hedging puts, due to the increased stock borrow fee. Occasionally, (usually when the stock is under-going a special situation of some sort), the stock borrow fee can rise very dramatically and the conversion will shift a huge amount.

How to deal with this scenario? For vol traders, a tendency to become short stock during the everyday course of trading, can suggest the borrow rate has

moved. Check with the clearing broker who should know the rate. For retail traders, particular those who do not delta-hedge, it could be argued that this represents an opportunity, in that calls may simply be trading cheap relative to the associated puts, from a strictly directional point of view. However, the main point here is to warn against launching into a conversion simply because it 'looks wrong relative to what put-call parity suggests'. There is almost always a reason and a change in the stock borrow fee is one. As an example, the author has experienced conversions in simple, short term equity options moving 30 or 40 cents, due to the stock borrow fee. Not discovering this until

the conversion has been 'legged' into for 5 cents, then 10 cents, then 15 etc. is rather painful.

Trading when a stock has gone ex-dividend

Options on dividend-paying have a particular characteristic that can cause the conversion to shift dramatically and suddenly. The unwary trader can open his trading window one day and see 'opportunities' to trade conversions for a large profit. He suspects that the automatic quoting machines in the market have made a terrible mistake and forgotten all about put-call parity. Alas the trader has overlooked the fact that the stock is now, from the option market perspective, trading ex-dividend.

Without explaining this in precise detail, the owner of deep in-the-money calls often has a decision to make regarding early exercise. Approximately speaking, it is worth exercising the calls early (and foregoing any extrinsic value they might have) if collecting the dividend (by owning the stock), is a better deal. Depending on how long exercised options take to be converted into settled stock, the ex-dividend date can matter a great deal to the option conversion. After the relevant cut-off date, the conversion must trade *without* the dividend being a factor. The larger the dividend, the greater the sudden jump in the conversion will be. In this scenario, the conversion tends to jump discretely,

whereas in the case of the stock becoming hard to borrow the conversion can trend over days or weeks. But before trading conversions and ‘locking in free put-call parity mispricing profits’, check the corporate calendar for the stock in question. Many option traders get caught on this. The author knew of a serial offender, whose equity option trading career was fairly short-lived in consequence.

Trading over a special situation

Once dividend announcements, ex-dividend dates, interest changes and hard-to-borrow stock factors have been discounted, the suspicious option trader should also look for news regarding

special situations or corporate actions. Sometimes a company will announce a plan that may affect the option conversion indirectly. It is hard to generalise about these because, by definition, they are special situations. They might include irregular special dividends or unusual share splits for instance. Be on the look out for anything that might affect certain shareholders in certain ways and therefore affect the stock lending market. Relatively large fortunes have been made and lost by option traders (and trading firms) who have carefully analysed/not bothered to read, the prospectus relating to a special corporate action. In one instance, a proposed action meant that the

conversion in one equity option market would jump by \$1.50 if the action went ahead, but only move by a few cents if it did not. An alert options trading firm promptly traded tens of thousands of conversions (with a large contract multiplier) against sleepy investment bank trading desks, who thought they were simply collecting a nice few cents of edge relative to what put-call parity suggested was fair value. A nasty shock awaited the trading desks when the corporate action came to pass.

So when all else has been checked, look out for a special situation. Indeed, look out for special situations at all times, since they can subsequently shift

conversions and can represent opportunities for those on the ball.

Creating a vega neutral calendar when the fronts go bid

This is not so much a foolish blunder but more a strategy with an appealing logic but often dire consequences for those who fall for its superficial allure. Picture this scenario. The underlying has started to move violently. Up, down; lots of actual volatility compared to recent levels. Very often, the implied volatility, especially in the near term options will rise, in absolute terms, more than volatility in the longer term options. Let's use some numbers. Assume prior to the movement that implied volatility was flat across the curve of option

expirations at 25%. Now assume the spot market is moving with something like 50% volatility. The front month option implied volatility will probably rocket up to something closer to 50%. Whereas the 2 year options may not move much at all. A trader makes the following assertion: implied volatility, across the curve, is very likely to revert to being flat(ter) once this period of actual volatility is over. So, I would like to sell short the front month implied volatility and buy the longer dated implied volatility. Someone then points out to the trader that there is more vega in the longer dated options than in the shorter dated options. So if he wants to be vega-neutral (i.e. not have an

exposure to the general level of implied volatility in the market), then he should sell more options in the nearer term months than he buys in the longer term months. Thanking his friend, the trader promptly enters into a large calendar ratio spread; selling front month options several times over for every longer term option he buys. He estimates his overall implied volatility exposure to be zero and sits back and waits for the implied volatility curve to revert to being flatter, via which he will accrue nice vega profits. He reports this sure-fire winning vega-strategy to his friend, who innocently asks what short gamma hedging strategy the trader intends to employ. An answer to which, from the

vega trader comes there none.

Selling implied volatility when it spikes often seems like a sure thing, from a mean-reversion perspective. And this 'vega-neutral ratio calendar spread' is just one incarnation of some species of 'short vol' trading. The trouble is that such ratio positions can be exceedingly short gamma; the position that was assumed was engineered to keep the net vega position at zero and in so doing ensured the net gamma position would be very short. This is for the obvious reason that gamma is concentrated in the front month options, and these were the options shorted in larger numbers. As a vega play, this strategy probably does

have a better than average chance of succeeding since high volatility is usually (eventually) followed by a period of lower volatility. But the option trader with the ratio calendar position may find himself carved up by the short gamma butcher in the meantime. After all, the high implied volatility in this case reflects high *actual* volatility.

In conclusion, this is obviously not a warning against ever selling volatility; the idea is broader than that. Rather it is to say that any option strategy primarily attempting to profit via one Greek (here, vega), should never ignore the possible effects owing to the other Greeks.

Ignoring the calendar

Time matters to options and therefore to option traders. However, whereas time runs in a smooth fashion, the trading calendar is more disjointed. In the theoretical modelling world, one day is broadly equal in meaning to the next; the only difference being quantitative rather than qualitative. In other words, in theory land the difference between today and tomorrow is simply 24 hours. In practice, there are human calendar effects to consider. Exchanges tend not to be open for trading 24 hours a day. The trading week does not include the weekend. Nations have public holidays when exchanges are shut. Public holidays vary from country to country etc. etc. And news does not tend to

emerge at a constant rate. Major economic announcements are often scheduled. All of this matters to the options trader. Not looking ahead at the trading calendar nearly always costs the trader money because it means he is entering into trades with less information than he ought to have. A classic example is the tendency for options to 'erode' (i.e. decline in value) steadily on a Friday afternoon because of the weekend, when of course the exchange is generally shut and no volatility in the underlying can occur. Most traders will be aware of this phenomenon and will take it into account. But suppose the trader notices the options being sold off on a Friday even more cheaply than

usual. He smells an opportunity and decides to go long options over the weekend hoping for a bounce in value on Monday when the option market re-opens. It is usually at this point that his colleague on a neighbouring desk will ask him if he has any plans for the long weekend, seeing as Monday is a Public Holiday.

From these examples, it might be thought easy to always find a reason not to trade; always a reason that explains away every situation and means that there is never any 'edge' to be had. That is certainly not the intention. Rather it is to give the reader a better chance of eliminating common reasons for

particular movements in option prices before he or she is sucked into a trade which confers no realistic advantage. Successful trading often involves spotting anomalies and reacting quickly and accurately. The point here is to increase the reader's chances of knowing which anomalies are opportunities, which are neither here nor there and which are poisoned chalices.

Order entry

Probably the most common cause of options pain is self-inflicted: an error

made whilst entering orders. Eliminating these avoids unnecessary expense from reversing positions, unnecessary risks from unwanted positions and potentially high cost mistrades that cannot be cancelled. Essentially, order entry errors have a single shared cause; carelessness. Naturally, humans make mistakes. A typical option order entry 'form' will include a strike, call or put, expiration, underlying, price, quantity and order type. Sometimes the trader will be completing the order entry form in a matter of seconds and if any one detail is wrong, the entire order is likely to be 'a mistake' of some magnitude. So there is plenty of scope for error. Here we outline some of the most common and

suggest preventive measures.

Buying instead of selling

Generally this mistake is harder to make than might be thought likely, the reason being that the order entry form is often triggered by clicking different things for a buy order and a sell order. A simple adaptation is to use different colours for the order submit button and have it labelled BUY or SELL as appropriate. And yet still, mistakes will happen. Concentration is probably the only other defence.

Wrong expiration

Probably an easier mistake to make than the buy/sell error, since the order entry

form is likely to look accurate but for one detail, such as JUL instead of JUN. Aside from physically clicking in the wrong expiration in order to call up the order entry form, there is also the possibility of choosing the wrong expiration through ignorance regarding expiration dates. It cannot be assumed that every option expires in the month after which it is named. In other words, January options may not expire in January. This is particular the case with respect to options on some futures contracts. The solution is obvious; check the contract specification with the exchange where the option is listed before trading.

Selling a deep in the money option at 1 tick

where the exchange has no mistrade rule

This sounds specific and so it is, being one of the worst cases of a mistrade that can happen to an option trader. A mistrade is one which is accidental on the part of the initiator, usually due to entering the order in the wrong place or at the wrong price etc. Exchanges will generally have rules governing the procedure for what constitutes a mistrade and how the injured party can (if at all) get the trade reversed. **All option traders should know the mistrade rules for the markets into which they trade.** This is imperative. If the unfortunate trader fails to abide by the mistrade rules, the loss can be devastating. For example, consider a

trader who decides to sell some very low delta puts at 1 tick, but he accidentally enters the “sell at 1 tick” order into the equivalent in-the-money call. The loss can be vast in this case, with the trader selling something at 1 which might be worth any number; 10, 50, 100 etc. What happens next depends on the exchange and the action of the trader. Some exchanges may cancel the trade automatically. Others may only cancel if the initiator of the trade complains. And other exchanges may refuse to take any action whatsoever. A mistrade can wipe a trader out in such cases. To avoid this, be fully aware of the rules. Realise which orders are most risky in this regard e.g. placing an order

into an electronic order book where there is currently no visible market. Ensure that risk management systems are able to pick up the error in real time and that alerts will sound. Keep your real-time profit and loss in view and if possible create alerts for any extreme change (positive or negative).

Trading against the wrong underlying price

This refers not so much to trading with the wrong underlying product in mind, but with the appropriate underlying contract incorrectly priced. Traders who value options with a mathematical model need to input values for several variables, such as the time to expiration, implied volatility and of course the spot

price. Of all these variables, the spot price is usually the most changeable on a minute-to-minute basis. So, many traders will set up their pricing model to take the spot price as a real-time updating variable. This preserves their valuation's accuracy, for tick-to-tick movements in the underlying. However, this price data feed must be exceedingly reliable if the trader will be making trades directly based on his real-time valuation. Whereas other inputs to the model being inaccurate can make the valuation so wildly wrong that it is immediately obvious (e.g. using the wrong expiration month), using a spot price inaccurate by only a few ticks can render the valuation wrong but still

plausible. A common indication that the spot feed has been lost is an apparent shift in the conversion price, as reflected by auto-quoting machines in the electronic order book. Very quickly, call will start to look well bid and puts will look cheap (or *vice versa*). In all probability, it is the trader's model or data feed that has failed since the on-screen markets are usually a combination of orders from multiple market participants; hence it is more likely to be a failure at the trader's end, rather than a simultaneous and identical failure at a multiplicity of other trading firms.

Preventing losses : an action plan

Many of the losses described in this volume are avoidable with some forethought. Here we suggest an actionable 5 point plan.

1. **Study options.** Technical knowledge is a critical defence. It reduces the likelihood of entering into trades on a false premise, reduces the chances of a casual mistake and increases the trader's ability to see when something has

gone wrong.

2. **Be alert.** Lapses of concentration are at the root of many of the problems discussed. Learn techniques to improve discipline and focus. Sleep sufficiently. Analyse your ability to sustain concentration. Does it dip at certain times of day?
3. **Know the rules.** Contract specifications, exercise and assignment, mistrade rules, early exercise etc. Be sure to keep up-to-date as rules can and do change. Do not assume rules and regulations are identical across exchanges. This is particularly important for traders whose trading platforms do

not make it immediately obvious on which exchange they are trading.

4. **Regularly risk assess your trading setup.** Having read this volume, review your own trading approach. Everything from forming strategies through to executing trades through to your back office settlement procedure. Do any of the ideas or similar themes in this volume apply? Assuming the answer is yes, what measures can you put in place to prevent the likelihood of an error? Can you set up an alert to prevent an error occurring? Can you set up an early-warning alert for a situation where an error occurs without your

knowledge?

5. **Record and assess errors.** Errors and losses will happen. Do not let them go to waste. Learn from them. Why did it happen? How could it have been prevented? What improvements will prevent its recurrence? Some errors (although significantly less than half, in the author's experience), will be profitable. Treat these with equal seriousness to loss making errors.